

Adding and Subtracting Polynomials Notes

Rules in Addition and Subtraction of Polynomials:

Rule 1: To add two or more monomial with the same literal coefficient, add only their numerical coefficient and affix the literal coefficient.

Rule 2: To add two or more polynomials, add similar or like terms together.

Rule 3: To subtract polynomials, change the sign of the subtrahend and proceed as in addition.

Rule 4: to remove grouping and symbols such as parenthesis (), Brackets [] and braces {} preceded by a

(i) minus sign, change the sign of each terms;

(ii) plus sign, no further change is done;

(iii) factor, use distributive law.

Sample Problem 1: find the sum of the following polynomials

<p>1. $8 + x^2$ and $x^2 - 1$</p> $\begin{array}{r} x^2 + 8 \\ (+) x^2 - 1 \\ \hline 2x^2 + 7 \end{array}$	<p>2. $3a^2b + 4a - 9$ and $7 + 2a^2b - 4a$</p> $\begin{array}{r} 3a^2b + 4a - 9 \\ (+) 2a^2b - 4a + 7 \\ \hline 5a^2b - 2 \end{array}$
<p>3. $2a - 3b + 4c$ and $-4a - 4c$</p> $\begin{array}{r} 2a - 3b + 4c \\ (+) -4a - 4c \\ \hline -2a - 3b \end{array}$	<p>4. $1 - 6a$ and $5 - 4a + 3a^2$</p> $\begin{array}{r} 3a^2 - 4a + 5 \\ (+) -6a + 1 \\ \hline 3a^2 - 10a + 6 \end{array}$

Sample Problem 2: Subtract the following polynomials

<p>5. $2a - 3b + 4c$ and $-4a - 4c$</p> $\begin{array}{r} 2a - 3b + 4c \\ (-) -4a - 4c \\ \hline 2a - 3b + 4c \\ (+) 4a + 4c \\ \hline 6a - 3b + 4c \end{array}$	<p>6. $3a^2b + 4a - 9$ and $7 + 2a^2b - 4a$</p> $\begin{array}{r} 3a^2b + 4a - 9 \\ (-) 2a^2b - 4a + 7 \\ \hline 3a^2b + 4a - 9 \\ (+) -2a^2b + 4a - 7 \\ \hline a^2b + 8a - 16 \end{array}$
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Sample 3: Simplify the following polynomials, remove {}, [] and ().

<p>7. $-(2x - y + 10) + (4x - 3y) - 2(3x - 4y + 6)$</p> $\begin{array}{r} -2x + y - 10 + 4x - 3y - 6x + 8y - 12 \\ \hline -4x + 6y - 22 \end{array}$	<p>8. $4x - 2y - 5 - 2(8x - 7y) - (3x - 4y - 1)$</p> $\begin{array}{r} 4x - 2y - 5 - 16x + 14y - 3x + 4y + 1 \\ \hline -15x + 16y - 4 \end{array}$
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Sample 4: solve the following

9. Subtract $4x + 3y + 5$ from the sum of $-3x - y + 5$ and $x + 8y - 3$

$$\begin{aligned}
 &(-3x - y + 5 + x + 8y - 3) - (4x + 3y + 5) \\
 &-2x + 7y + 2 - (4x + 3y + 5) \\
 &-2x + 7y + 2 - 4x - 3y - 5 \\
 &\quad \quad \quad -6x + 4y - 3
 \end{aligned}$$

10. Subtract the sum of $2x - 3y - 8z$ and $-3x + 5y - 11z$ from the sum of $-12x - 5y - 9z$ and $-8x + 2y + 12z$.

$$\begin{aligned}
 &(-12x - 5y - 9z) + (-8x + 2y + 12z) \\
 &\quad \quad \quad -20x - 3y + 3z \\
 &(2x - 3y - 8z) + (-3x + 5y - 11z) \\
 &\quad \quad \quad -x + 2y - 19z \\
 &(-20x - 3y + 3z) - (-x + 2y - 19z) \\
 &\quad \quad \quad -20x - 3y + 3z + x - 2y + 19z \\
 &\quad \quad \quad -19x - 5y + 22z
 \end{aligned}$$